CRC

Objective

Cyclic redundancy checks are a common method in communication systems - in particular in embedded systems - employed to assure that the data sent and received are the same. The references provided below give us an overview and a guide to the theory as well as practical considerations.

A particular design then would have to make a choice based on the level of assurance it provides - in particular about the ability of the algorithm to detect single bit, multiple bit errors.

NOTE

The references provided here cover the theoretical underpinnings - thus guiding the selection of an appropriate CRC algorithm for each checksum size (the polynomial selection). It is not a goal of this projectlet to evaluate the polynomials themselves - instead relying on experts and published literature to choose an appropriate polynomial.

REFERENCE

http://www.ross.net/crc/download/crc_v3.txt
https://en.wikipedia.org/wiki/Computation_of_cyclic_redundancy_checks
http://www.sunshine2k.de/articles/coding/crc/understanding_crc.html

User needs and requirements

This projectlet is to fulfill the need of software engineers.

Id	Need/Requirement
1	The user needs a crc16 algorithm to calculate the crc of a block of data
2	Given a polynomial, the user needs to generate an initial table
3	The user needs to calculate the CRC of a given string - using the polynomial specified
4	The user needs to calculate the CRC of a file - using the polynomial specified
5	

Specifications

Id	Wants
1	Use -p or —polynomial to specify the polynomial of 16 bits. The default algorithm will be used with no specification of the polynomial.

Id	Wants
2	The switch -x or —hex-string indicates that the argument is to be treated as a hex string and converted into binary to compute the CRC
3	The switch -s or —string indicates the argument is a string and the CRC is to be computed for the null terminated string
4	The switch -t or —table just prints out the initial CRC table for the indicated polynomial
5	The switch -f or —file indicates the argument is a file for which the CRC is requested.
6	The switch -l or —lines indicates the argument is a file and each line of this text file is treated as a null terminated string and the CRC values are computed.

Example usage